

What is claimed is:

1. A sensor using radiation pulses, said sensor comprising:  
an emitting device for emitting radiation pulses repeatedly; and  
5 a receiving device for receiving said radiation pulses, said receiving device including converting means having an output line for converting the received radiation pulses into electrical pulses;  
said receiving device including pulse judging means for judging whether an electrical pulse appearing on said output line of said converting means is a true electrical  
10 pulse caused by receiving the radiation pulses emitted from said emitting device or a false electrical pulse caused by noise on the basis of a known waveform characteristic of said true electrical pulse;  
said receiving device generating an output signal on the basis of result of judging by said pulse judging means.
- 15 2. The sensor of claim 1 wherein said known waveform characteristic comprises standard values on the waveform of said true electrical pulse at two or more standard times.
- 20 3. The sensor of claim 1 wherein said known waveform characteristic comprises standard values on a waveform obtained by differentiating the waveform of said true electrical pulse at two or more standard times.
- 25 4. The sensor of claim 2 wherein said standard times corresponds to peaks on the waveform of said true electrical pulse.
- 30 5. The sensor of claim 4 wherein said standard times include both one corresponding to a peak with positive polarity and another corresponding to a peak with negative polarity.
6. The sensor of claim 2 wherein said pulse judging means comprises:

two or more comparators each for comparing signal level appearing on said output line of said converting means by a standard value corresponding to said true electrical pulse;

5      delay means for delaying an output of one of said comparators such that the outputs from said comparators are adjusted in time such that the standard times associated with said outputs match; and

logical calculation means for carrying out logical calculation on the time-adjusted outputs from said comparators.

10      7.      The sensor of claim 1 wherein said radiation pulse is light pulse.

8.      A sensor using radiation pulses, said sensor comprising:  
an emitting device for emitting radiation pulses repeatedly; and  
a receiving device for receiving said radiation pulses, said receiving device  
15      including converting means having an output line for converting the received radiation pulses into electrical pulses;  
said emitting device including pulse transmitting means for transmitting said radiation pulse according to a specified bit pattern;  
said receiving device including:  
20      pulse judging means for judging whether an electrical pulse appearing on said output line of said converting means is a true electrical pulse caused by receiving the radiation pulse emitted from said emitting device or a false electrical pulse caused by noise on the basis of a known waveform characteristic of said true electrical pulse; and  
bit pattern judging means for making a comparison between the bit pattern of  
25      electrical pulse judged by said pulse judging means to be a true electrical pulse and a standard bit pattern and judging according to result of said comparison whether radiation pulse was normally received;  
said receiving device generating an output signal on the basis of result of judging by said bit pattern judging means.

9. The sensor of claim 8 wherein said bit pattern judging means simultaneously compares the bit pattern of said electrical pulse appearing on said output line of said converting means with two or more preselected standard bit patterns with different phases, said sensor thereby judging whether said radiation pulse was normally received.

10. The sensor of claim 8 wherein said bit pattern judging means makes said comparison with redundancy.

11. The sensor of claim 8 wherein said radiation pulse is light pulse.

12. A photoelectric sensor comprising:  
an emitting device for emitting light pulses repeatedly; and  
a receiving device for receiving said light pulses, said receiving device including  
15 converting means having an output line for converting the received light pulses into  
electrical pulses;  
said emitting device including pulse transmitting means for transmitting said light  
pulses according to an emission bit pattern based on arrangement of bits each indicating  
emission and non-emission of light, respectively;  
20 said receiving device including:  
bit generating means for generating light indicating bits each indicative of  
whether or not an electrical pulse appeared on said output line of said converting means;  
and  
bit pattern judging means for making a comparison between a received bit pattern  
25 based on said light indicating bits and a standard bit pattern based on said emission bit  
pattern and judging from the result of said comparison whether a light pulse emitted  
from said emitting device has been normally received;  
said photoelectric sensor generating an output signal on the basis of result of  
judging by said bit pattern judging means.

13. The photoelectric sensor of claim 12 wherein said emission bit pattern is one of a plurality of preliminarily prepared emission bit patterns each having a different arrangement of said bits indicating emission and non-emission of light.

5 14. The photoelectric sensor of claim 12 wherein said emitting device further includes means for generating randomly said emission bit pattern.

10 15. The photoelectric sensor of claim 12 wherein said emission bit pattern arranges said bits indicating emission and non-emission of light in maximal-length sequence.

15 16. The photoelectric sensor of claim 12 wherein said bit pattern judging means compares said received bit pattern simultaneously with two or more standard bit patterns.

17. The photoelectric sensor of claim 12 wherein said bit pattern judging means makes said comparison with redundancy.

18. The photoelectric sensor of claim 12 wherein said emission bit pattern 20 includes at least two bits in a row indicating emission.

19. The photoelectric sensor of claim 12 wherein the number of bits in said emission bit pattern is variable.

25 20. The photoelectric sensor of claim 12 wherein the length of bit in said emission bit pattern is variable.